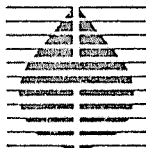


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November 8, 1988

RESULTS OF THE SEDIMENT SURVEY AND SAMPLING
IN SANITARY SEWERS ASSOCIATED WITH
THE MONTROSE SITE, AUGUST - SEPTEMBER 1988



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This report summarizes the results of the sediment survey and sampling program completed in the Los Angeles (L.A.) County sanitary sewer between the area just north of the Montrose site and the L.A. County Joint Water Pollution Control Plant (JWPCP) treatment facility. This program was performed by Hargis + Associates, Inc. (H+A) on behalf of Montrose Chemical Company with assistance from L.A. County Sanitation District (LACSD) field personnel. Analytical and field support services were provided by Brown & Caldwell Laboratories.

The Montrose site is located approximately four miles upstream from the JWPCP. Raw sewage from the region around the Montrose site is carried to the JWPCP by two main trunk sewer lines referred to as the JO "D" line and the District 5 Interceptor. These lines are parallel for some distance and are interconnected at some locations. The Montrose facility reportedly discharged process wastewater into the JO "D" line from 1947 until 1971. In 1963 the District 5 Interceptor was constructed and Montrose reportedly discharged process wastewater into it. Discharge of process water into the sewer continued until 1971.

Past sampling by various parties has shown that sediment in the subject sewer lines contained elevated concentrations of DDT. Because no comprehensive sampling program had been undertaken, the extent of sediment and concentration of DDT in the lines could not be determined. This program was designed by the U.S. Environmental Protection Agency (EPA) and their contractor, CH2M Hill, to provide data which would allow the impact of various sewer cleaning and repair options to be evaluated.

The sediment survey and sampling work was performed between August 23 and September 9, 1988. Liquid sewage and sediment samples and other related



data were collected in the District 5 Interceptor and the JO "D" sewer lines at specified manholes. Procedures for this work were consistent with the Quality Assurance Project Plan (QAPP) and the Sampling Plan (CH2M Hill, December 1987) for the project with the modifications approved by the EPA.

SAMPLING PROCEDURES

Sewer sampling was conducted at night and in the early morning between the hours of 11:00 p.m. and 9:00 a.m. the following day when sewage flow rates were expected to be at a minimum. Actual sampling activity usually began around 12 midnight because the first hour of work entailed setting up equipment for traffic control and venting the sewer. Los Angeles County Sanitation Department (LACSD) personnel completed all tasks involved with traffic control and sewer entry, including sending sampling personnel into the sewer to perform field measurements and to collect samples. Brown & Caldwell Laboratories provided personnel to prepare samples once they were brought to ground level. On-site coordination was provided by Hargis + Associates, Inc. (H+A).

Sampling procedures were followed as outlined in the previously referenced QAPP with modifications. Modifications included sampling and sediment depth measurements using personnel inside the sewer instead of on the ground surface, collecting background samples in a flexible instead of a rigidly defined sequence, and elimination of the need for rinsate blanks. Sampling procedures are presented in the following discussion with special attention given to the procedural changes just listed.

The approved QAPP typically designated sets of three potential manholes for collection of each sample. Sometimes fewer manholes were identified. These manholes were defined as primary, secondary, and tertiary manholes. Collection of sediment and liquid samples was attempted first from the primary manhole. If no sediment was found in the primary manhole, sample collection was attempted from the secondary manhole. If no sediment was



found in the primary or secondary manholes, collection of samples was attempted in the tertiary manhole.

Only one of the three manholes was entered if sediment was collected in the primary sample location. At least two of three manholes in each designated set of three manholes were entered if no sediment was collected in the primary manhole. Some manholes were not sampled because the county foreman on site determined that manholes were unsafe to enter. Other manholes were not entered because they were not accessible to county trucks. County trucks were required near the manhole because they contained a winch and cable used to lower personnel into the sewer.

Sampling personnel always entered the primary manhole when it was safe and accessible. If no sediment was present, the sampling team proceeded to the secondary manhole where pole probing was used to determine if sediment was present in the sewer. Sampling personnel entered the sewer at the secondary manhole if pole probing indicated sediment was present. The sampling team proceeded to the tertiary manhole if no sediment was collected at primary or secondary sampling locations. Sampling personnel entered the tertiary manhole to directly verify the presence or absence of sediment and to attempt the collection of sediment samples.

Pole probing was frequently performed on remaining manholes in a given set of manholes after sediment samples were obtained. Pole probing was found to be an effective way of determining the presence or absence of sediment in the sewer. It was estimated that sediment depth measurements made with pole probing were accurate to plus or minus 0.5 inches.

A specific sequence of procedures was used during sampling at each manhole. Traffic control and ventilators were set up to begin the sampling procedure. The decontamination station was then assembled and the manhole cover removed. A sample of liquid sewage was obtained in a stainless steel bucket and the temperature, pH, and electrical conductivity of the liquid sewage was determined. The L.A. county personnel then determined the



velocity of the sewage flow using a portable meter. Liquid sewage samples were then collected from the surface using procedures outlined in the approved QAPP. After liquid sampling was completed, sediment samples were collected by directly entering the sewer. Liquid and sediment samples were obtained from the same manhole when possible as designated in the QAPP.

Sediment samples were collected by county personnel who physically entered the sewer. The person designated to complete sampling was lowered on a cable after donning proper protective equipment including respirator, hip waders, rainsuit jacket, gloves, and hard hat. Limited space entry procedures were consistent with L.A. County policy.

Sampling personnel observed whether sediment was present by stepping down onto the bottom of the sewer. Sediment depths were measured using a yardstick attached to a 3.5 foot aluminum pole. If sediment was present, the man in the sewer measured the depth of sediment by first determining the distance between the sediment surface and liquid surface in the sewer using the yardstick. The pipe and yardstick were then pushed through the sediment to the bottom of the pipe and the distance between the pipe bottom and liquid surface was determined. The sediment depth was then calculated by subtracting the first measurement from the second measurement.

A sediment sampler, consisting of a one pound coffee can attached to a six foot aluminum pole, was used to collect sediment samples. Each coffee can was decontaminated prior to use and was not reused. The sampling personnel first attempted to collect sediment downstream. The sampler with its contents was then lifted to the surface in a bucket where the sampler was emptied. The sampler was lowered back into the sewer and a second sample was then collected in the center of the sewer directly below the manway and returned to the surface. Then a third sample was collected upstream in a similar manner. The sampling personnel in the sewer was then lifted back to the surface. Proper decontamination procedures were used to clean the outer garments of the sampling personnel using the decontamination station.



Sediment samples were dumped in a decontaminated aluminum pan at the surface. Laboratory sample containers were filled from sediment collected in this pan. Volatile samples were prepared first to minimize loss of compounds with higher vapor pressures. Many of the sediments collected were high in gravel content, therefore, it was difficult to eliminate void spaces in the vials specified for volatile samples. It was determined in the field that liquid collected in conjunction with the sediment would be used to fill the void spaces. The CH2M Hill representative on-site agreed with this recommendation and it was instituted on the third day of sampling. Upon completion of sample preparation, the aluminum pan and any remaining sediment and other discarded materials were transferred to a plastic trash bag and placed in sealed steel drums that were properly labelled and stored on the Montrose site. These materials will be disposed of using proper procedures at a future date.

Background samples were collected at the rate of one per day at the sample points designated in the approved QAPP. The sample order, as designated in the QAPP, was modified with EPA approval to allow flexibility in the field. The modified procedure required that one background manhole would be sampled per day and the manhole would be located on a line that had other sampling completed during the same day. It was also decided that background sediment samples should be collected, if possible, from at least two of the background manholes on the JO "D" line and the District 5 Interceptor. Because sediment was found in only one manhole from each line, only one background sediment sample was obtained for each of the two lines.

Rinsate blank samples were not collected during the sampling process because all sampling equipment was used once and then discarded. Therefore, decontamination verification was not required. This procedure was consistent with recommendations outlined in David Wilson's letter to Johanna Miller (CH2M Hill, August 26, 1988).



ANALYTICAL PROCEDURES

Analyses were performed in accordance with the third edition of SW-846 (USEPA, November 1986). A standard operating procedure further detailing the protocols for pesticide analyses was provided to the EPA (H+A, July 1988) and was approved for use. Analytical procedures were further modified as outlined in two letters written by Tom Huetteman to Johanna Miller (USEPA, August 8 and August 11, 1988). Additional changes were made and approved in telephone conversations in August and September 1988.

A modification of the sample preparation procedure for liquid sewage analysis was recommended by H+A and approved by EPA before the analytical program was initiated. The suspended solids in the liquid sewage were separated from the liquid phase using glass wool instead of by centrifugation as outlined in the QAPP. The solids were then treated with an acetone/hexane solution and the aqueous phase was treated with a methylene chloride solution to extract chlorinated pesticides. The extracts from both the solid and aqueous phases were then recombined and reduced to a volume of 10 ml by heating and evaporating the solvents. Cleanup procedures and pesticide analysis were performed on the combined sample. The QAPP had indicated that separate cleanups and analyses of the solid and liquid phases would be performed. Recombination thus allowed one analysis for each liquid sample instead of two.

It was agreed that solvent extractions would be performed on sediment samples using both one gram and ten gram aliquots of sample. The QAPP had indicated one gram and 30 gram aliquots would be used.

PRESENTATION OF DATA

Temperature, flow depth, flow velocity, pH, and electrical conductivity of the sewage were measured at 44 manholes (Table 1). These data are summarized from field notes originally transmitted to the EPA in October



1988 (H+A, October 1988). Sewage levels and flows were minimal during the early morning hours between 1:00 and 4:00. The levels and volumetric rates in the sewers typically began to rise at 4:00 a.m. and continually increased through the end of sampling around 9:00 a.m.

Sediment samples were collected from a total of 19 manholes. Two of these samples were background samples collected in the sewer lines upstream from the potentially affected areas. All of the samples collected were analyzed for chlorinated pesticides using EPA Method 8080 (Table 2). All DDT concentrations discussed in this report are total DDT values. Total DDT concentration is defined as the sum of concentrations determined for all the following compounds: o,p-DDD, o,p-DDE, o,p-DDT, p,p-DDD, p,p-DDE, and p,p-DDT. Additional data were developed for sediment samples from four manholes including analyses for volatiles, semi-volatiles, metals, cyanide, total organic carbon, oil and grease, Atterberg limits, and particle size distribution (Tables 3 through 7). Raw analytical data were provided to the EPA in October 1988 (H+A, October 1988).

RESULTS

Pesticide data have been evaluated as part of this report. Seventeen sediment samples were analyzed for pesticide content. Nine sediment samples were collected from the JO "D" line and eight were collected from the District 5 Interceptor line. All sediment samples contained DDT at a detectable level. Excluding background samples, DDT concentrations ranged from a low of 0.81 mg/kg to a high of 210,000 mg/kg. These analytical results will be used later in the report to estimate masses of DDT that are present in the sediments in the two sewer lines.

Most of the sediment collected from the sewer with the exception of one segment of pipe near the Montrose site, consisted of fines, sand and gravel. This aggregate probably resulted from the degradation of the concrete pipe from which the sewer is constructed. Degradation is caused by hydrogen



sulfide (H_2S) generated from biological activity in the sewer. The H_2S causes the crown of the pipe to disintegrate due to removal of the cement in the concrete pipe. Once cement is removed from the concrete, the sand and gravel once bound in the concrete, are released and can fall to the bottom of the sewer. This aggregate then gradually builds up over time and is washed toward the JWPCP unless it is caught in syphons or other areas of low velocity in the sewer.

Sediment in the JO "D" line between manholes D25 and D32 was much different than the sand/gravel sediments observed in other parts of the JO "D" or District 5 Interceptor lines. Sediment in this pipe segment consisted primarily of a viscous, sticky tar that varied in color from brown to black. Total DDT concentrations as high as 210,000 mg/kg were determined for this tar. This concentration is two orders of magnitude greater than was observed in any other sediment collected from the sewer. This tar contained very little gravel or sand. Tars were not observed in any other portion of the sewer included in this investigation. Most of the DDT estimated to be in the sewers were found in this tar-like sediment. The weight of DDT in this sediment totaled 14,245 pounds accounting for 99 percent of the DDT identified in both sewer lines.

Seventeen liquid sewage samples were analyzed for chlorinated pesticides content. Ten of the liquid sewage samples were collected from the "D" line and seven of the samples were collected from the District 5 Interceptor line. DDT concentrations in liquid sewage samples varied from none detected (<2.0 ug/l) to a maximum of 530 mg/l.

During field sampling operations, composite samples were collected at the JWPCP for chlorinated pesticide analysis (Table 9). Composite samples were collected at the inlet to the JWPCP over a 24 hour period beginning at midnight. DDT levels in these samples vary from none detected (<2.0 ug/l) to 24 ug/l.



Eight background liquid sewage samples were collected from the sewer line upstream from the Montrose site. Four of these samples were collected on the JO "D" line, and four of them were collected on the District 5 Interceptor line. Concentrations of DDT varied from none detected (<2.0 ug/l) to 37 ug/l.

Blanks, laboratory control standards and mid-point calibration samples indicate that all liquid samples containing DDT, including composite and background samples, may have been affected by DDT cross contamination during sample preparation or analysis. The source of cross contamination appears to have been the GPC apparatus. The impact of this cross contamination on the liquid samples has not yet been quantified. Additional validation is in progress to determine the extent and magnitude of possible DDT cross contamination in the liquid samples.

Analytical results generated from EPA split samples collected by CH2M Hill during the sampling program were not yet available at the time this report was prepared, and therefore have not been included in this evaluation. Validation is expected to continue through the next several weeks to assess all QA/QC data. A better assessment of the data quality will be available once that validation is completed.

ESTIMATES OF SEDIMENT VOLUME AND DDT CONTENT IN THE SEDIMENT

Sediment volume was calculated using sediment depths measured along each of the sewer lines. The DDT mass contained within the sediment was then estimated using the DDT concentrations reported for the sediment samples and from an assumed sediment density.

Sediment volumes were calculated by averaging the cross sectional areas occupied by sediment at each end of a sewer pipe segment. This average cross sectional area was then multiplied by the pipe segment length to calculate sediment volumes. "As built" drawings of the sewer lines were



provided by LACSD. Pipe diameters and lengths used in sediment volume calculations were obtained from these drawings.

The total mass of sediment contained within each segment of pipe was calculated by multiplying the estimated sediment volume by an assumed sediment density of 100 lbs/ft³. This sediment mass was multiplied by the average DDT concentration in the pipe segment. An average DDT concentration was calculated by adding the concentrations of DDT determined from samples at each end of the segment and then dividing the sum by two.

Sediment in the JO "D" sewer line was found primarily in two segments. The first extended from a point between manholes D11 and D12 to a point between manholes D14 and D15. It is estimated that approximately 653 cubic feet of sediment is present in this interval. DDT concentrations in the sediment ranged from 150 mg/kg to 3150 mg/kg. The total mass of DDT estimated in this segment of the sewer totaled 148 pounds. The second segment of the JO "D" line containing sediment is adjacent to the Montrose site. It extends from a point between manholes D25 and D27 to a point between manholes D31 and D32. It is estimated that approximately 1391 cubic feet of sediment exists within this interval. The sediment is estimated to contain 14,245 pounds of DDT. A total of 2,052 cubic feet of sediment are estimated to exist in the JO "D" line between manholes D5 and D34 and is estimated to contain a total of 14,375 pounds of DDT.

Similar estimates were prepared for the District 5 Interceptor sewer line. The amount of sediment contained within the District 5 Interceptor totaled 1,868 cubic feet. The DDT content of the sediment was less than that observed in the JO "D" line and totaled 14.2 pounds of DDT. Most of this DDT is located in two segments of the sewer line. The first extends from a point between A443 and A444 to a point between A444 and A447. A total of 638 cubic feet of sediment contains an estimated 10.8 pounds of DDT within the segment. The second segment of pipe extends from a point between A470 and A471 to a point between A474 and A475. This segment of pipe is estimated to contain 1,147 cubic feet of sediment and 3.2 pounds of DDT.



ACCURACY AND PRECISION OF MEASUREMENTS

Potential sources of error can be identified for estimates of both sediment volume and DDT content in the subject sewer lines. It is difficult to quantify the accuracy of these measurements due to the limited data available. The following discussion describes potential sources of error in the sediment and DDT estimates.

The largest potential source of error in the estimation of sediment volumes is the assumption that sediment depth is consistent and predictable along the sewer. Variations in sediment depth were noted over short distances at several points in the sewer. The distribution of sediment in the bottom of the sewer varied with pipe geometry and flow velocity. Sediment appeared to be somewhat thicker in curved areas, in syphons, and other areas with a low velocity of flow.

The accuracy of the measurement of DDT concentration in sediments and liquids are reflected in the relatively large range of acceptable spike recoveries presented in the EPA Method 8080 protocol. It is also known that analysis of sewer sediment samples has been difficult based on problems CH2M Hill identified during the preliminary sampling and analysis completed in July 1987 (CH2M Hill, December 1987). Additional cleanup procedures and other potential improvements to sample preparation procedures were recommended by the EPA to remedy suspected analytical problems based on this preliminary sampling. Identified problems included interferences affecting DDT quantitation from GC analysis. The effects of these modifications recommended by CH2M Hill will be evaluated after data validation is complete.

Replicate data is limited for both laboratory and field measurements. This limitation renders evaluation of precision impossible.



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Tables

TABLE 1

SUMMARY OF PHYSICAL PARAMETERS MEASURED FOR THE LIQUID SEWAGE

LOCATION (LACSD MAN- HOLE #)	DATE	TIME	TEMPERATURE (DEGREES FAHRENHEIT)	VELOCITY (FEET/SECOND)	SEWAGE DEPTH (INCHES)	pH	EC (UMHOS)
A 442	08-29-88	04:30	78.7	3.2	39	6.7	900
A 444	08-29-88	06:40	78.4	4.1	15	7.1	2210
A 448	08-30-88	00:35	78.8	4.2	34	6.8	790
A 450	08-30-88	02:00	79.0	4.0	27	8.0	1600
A 453	09-01-88	00:05	78.6	3.2	33	7.0	1470
A 455	09-01-88	02:30	78.0	2.8	35	7.1	1450
A 457	09-01-88	03:45	78.6	2.6	27	6.7	1550
A 458	09-01-88	05:15	78.6	1.6	26	7.1	1200
A 459	09-01-88	05:45	78.4	2.2	18	7.1	1300
A 464	09-06-88	05:00	79.4	2.0	34	7.2	1600
A 467	09-06-88	02:05	79.6	2.8	42	7.1	1600
A 469	09-07-88	03:00	78.8	1.7	46	6.8	1600
A 470	09-07-88	05:55	79.1	2.1	32	7.1	1650
A 471	09-07-88	09:00	78.7	2.7	34	7.0	990
A 471	09-08-88	00:10	79.8	2.8	46	7.2	1450
A 473	09-08-88	07:15	79.2	2.2	31	7.3	2000
A 474	09-09-88	02:45	79.5	1.9	32	7.4	1650
A 475	09-09-88	06:25	78.7	1.3	29	7.2	1650
A 480	09-08-88	09:10	79.1	1.7	47	7.5	1620
A 481	08-30-88	06:15	78.0	1.8	27	7.0	1090
A 482	09-09-88	00:20	79.9	2.0	24	7.3	1490
A 483	09-01-88	07:50	77.8	2.3	31	7.1	1810
D 9	08-23-88	12:30	80.5	2.1	—	7.5	—
D 12	08-23-88	10:20	74.9	0.0	11	6.9	—
D 13	08-29-88	00:45	78.8	3.1	40	6.8	1450
D 14	08-30-88	05:45	78.5	2.2	28	7.1	1600
D 15	08-30-88	04:00	78.7	4.3	27	7.0	800
D 187	09-07-88	00:50	86.2	3.0	28	7.1	3180
D 189	09-06-88	08:30	86.5	3.1	30	7.8	4200
D 15A	09-01-88	02:00	78.6	4.5	29	6.4	1700
D 16	09-01-88	00:15	78.6	4.1	35	7.0	1590
D 18	09-06-88	00:00	79.8	3.5	31	6.8	1650
D 21	09-01-88	02:30	78.6	2.9	27	7.0	1450
D 22	09-01-88	05:15	78.3	2.2	20	7.1	1650
D 24	09-06-88	05:50	79.1	2.5	17	7.1	1520
D 25	09-06-88	08:05	79.1	2.4	17	7.1	1700
D 27	09-07-88	07:00	78.6	1.5	31	7.0	1850
D 29	09-08-88	03:00	79.8	2.6	30	7.0	1880
D 31	09-08-88	05:00	79.2	1.9	28	6.9	1900
D 32	09-09-88	01:30	79.7	1.3	39	8.4	1700
D 33	09-09-88	04:50	78.9	1.7	23	7.1	2020
D 39	09-07-88	00:00	79.8	3.0	40	7.0	1650
D 40	08-29-88	08:30	78.3	2.7	31	7.9	2100
D 41	09-01-88	08:15	78.0	2.6	35	7.5	1850
D 42	09-06-88	10:10	79.4	—	—	7.9	1550

HARGIS ASSOCIATES

TABLE 2

PESTICIDE CONCENTRATIONS (METHOD 8080) DETERMINED FOR
SEDIMENT SAMPLES

CUM HILL SAMPLE LOCATION	LACSD MANHOLE ID	DHC (mg/kg)					DDT (mg/kg)							
		ALPHA	BETA	DELTA	OMEGA	TOTAL	p,p'-DDD	p,p'-DDE	p,p'-DDT	o,p'-DDD	o,p'-DDE	o,p'-DDT	TOTAL	
MH-2	D-12	<200	<200	<200	<200	<200	1,400	610	1,200	<500	<250	<250	3,200	WO/GPC, not specified in Sampling Plan
MH-2	D-12	<200	<200	<200	<200	<200	1,600	470	1,000	<500	<250	<250	3,100	
MH-3	D-13	<200	<200	<200	<200	<200	1,400	380	750	<500	<250	<250	2,500	
MH-4	A-444	<40	<40	<40	<40	<40	110	130	100	<100	<50	<50	340	
MH-6	D-14	<8.0	<8.0	<8.0	<8.0	<8.0	91	59	<10	<20	<10	<10	150	
MH-6	D-14	<0.06	<0.08	<0.08	<0.08	<0.08	0.54	0.27	<0.1	<0.2	<0.1	<0.1	0.81	Duplicate
MH-7	A-455	<4.0	<4.0	<4.0	<4.0	<4.0	25	28	<5	<10	<5	<5	53	
MH-9	A-459	<2.0	<2.0	<2.0	<2.0	<2.0	22	15	<2.5	<5.0	<2.5	<2.5	37	
MH-13	D-21	<0.4	<0.4	<0.4	<0.4	<0.4	3.4	5.9	1.7	<1.0	<0.5	<0.5	11	
MH-14	D-23	<40	<40	<40	<40	<40	300	79	79	<100	<50	<50	460	
MH-14	D-23	<40	<40	<40	<40	<40	500	300	230	140	<50	<50	1,170	Duplicate
MH-15	A-464	<200	<200	<200	<200	<200	990	770	600	<500	<250	<250	2,400	
MH-17	A-470	<0.08	<0.08	<0.08	<0.08	<0.08	0.48	0.61	0.34	<0.2	<0.1	<0.1	1.4	
MH-18	D-27	<400	<400	<400	<400	<400	2,800	3,000	3,700	<1,000	<500	<500	9,500	
MH-19	A-471	<0.8	<0.8	<0.8	<0.8	<0.8	12	8.1	16	<2	<1	<1	36	
MH-20	D-29	<10,000	<10,000	<10,000	<10,000	<10,000	67,000	79,000	61,000	25,000	12,500	12,500	210,000	
MH-21	A-473	<0.8	<0.8	<0.8	<0.8	<0.8	11	6.2	11	<2	<1	<1	28	
MH-22	D-31	<40	<40	<40	<40	<40	160	84	120	<100	<50	<50	360	
MH-23	D-33	<0.4	<0.4	<0.4	<0.4	<0.4	<1.0	<0.5	1.6	<1.0	<0.5	<0.5	1.6	
MH-23	D-33	<0.4	<0.4	<0.4	<0.4	<0.4	<1.0	<0.5	1.6	<1.0	<0.5	<0.5	1.6	Duplicate
MH-24	A-475	<0.4	<0.4	<0.4	<0.4	<0.4	3.0	1.9	3.6	<1.0	<0.5	<0.5	8.5	
BACKGROUND SAMPLES														
	A-481	<0.08	<0.08	<0.08	<0.08	<0.08	<0.2	<0.1	<0.1	<0.2	<0.1	<0.1	<0.2	
	D-41	<0.08	<0.08	<0.08	<0.08	<0.08	0.84	<0.1	0.44	<0.2	<0.1	<0.1	1.3	
	D-41	<0.08	<0.08	<0.08	<0.08	<0.08	<0.2	<0.1	<0.1	<0.2	<0.1	<0.1	<0.2	

TABLE 3

**VOLATILE COMPOUND CONCENTRATIONS (METHOD 8240)
DETERMINED FOR SEDIMENT SAMPLES**

Sample ID/Hanhole Number	TOTAL DDT CONCENTRATION (mg/kg)							
COMPOUND	S-7/D-14	S-8/D-14	S-19/D-23	S-20/D-23	S-27/D-A-471	S-28/A-471	S-33/D-33	S-34/D-33
1,1,1-Trichloroethane.....	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
1,1,2,2-Tetrachloroethane.....	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
1,1,2-Trichloroethane.....	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
1,1-Dichloroethane.....	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
1,1-Dichloroethylene.....	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
1,2-Dichloroethane.....	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
1,2-Dichlorobenzene.....	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
1,2-Dichloropropane.....	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
1,3-Dichlorobenzene.....	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,3-Dichloropropene.....	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
1,4-Dichlorobenzene.....	<0.3	<0.3	1.4	1.4	1.0	2.6	4.7	5.2
2-Chloroethylvinylether.....	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5
Acetone.....	<3	<3	<3	<3	<3	<3	<3	<3
Acrolein.....	<7.5	<7.5	<0.3	<0.3	<0.3	<7.5	<7.5	<7.5
Acrylonitrile.....	<3	<3	<0.3	<0.3	<0.3	<3	<3	<3
Bromodichloromethane.....	<0.3	<0.3	<0.6	<0.6	<0.6	<0.3	<0.3	<0.3
Bromomethane.....	<0.3	<0.3	0.4	0.4	<0.3	<0.3	<0.3	<0.3
Benzene.....	<0.6	<0.6	<0.3	<0.3	<0.3	<0.6	<0.6	<0.6
Chlorobenzene.....	<0.3	0.4	<0.3	<0.3	<0.3	0.4	<0.3	<0.3
Carbon tetrachloride.....	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chloroethane.....	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Bromoform.....	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chloroform.....	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chloromethane.....	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
Dibromochloromethane.....	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Ethylbenzene.....	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Methylene chloride.....	<3	<3	<3	<3	<3	<3	<3	<3
Tetrachloroethylene.....	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Trichloroethylene.....	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Trichlorofluoromethane.....	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Toluene.....	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Vinyl chloride.....	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
trans-1,2-Dichloroethylene.....	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
trans-1,3-Dichloropropene.....	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5



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TABLE 4

SEMIVOLATILE COMPOUND CONCENTRATIONS (METHOD 8270)
DETERMINED FOR SEDIMENT SAMPLES

Sample ID/Manhole Number	TOTAL DDT CONCENTRATIONS (mg/kg)							
	S-7/D-14	S-8/D-14	S-19/D-23	S-20/D-23	S-27/D-A-471	S-28/A-471	S-33/D-33	S-34/D-33
COMPOUND								
1,2,4-Trichlorobenzene.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.3	<0.1
1,2-Dichlorobenzene.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.3	<0.1
1,2-Diphenylhydrazine.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.3	<0.1
1,3-Dichlorobenzene.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.3	<0.1
1,4-Dichlorobenzene.....	<0.1	<0.1	<0.1	0.7	<0.1	<1	<0.3	<0.1
2,4,6-Trichlorophenol.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	32	0.4
2,4-Dichlorophenol.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.3	<0.1
2,4-Dimethylphenol.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.3	<0.1
2,4-Dinitrotoluene.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.3	<0.1
2,4-Dinitrophenol.....	<1	<1	<1	<1	<1	<1	<0.3	<0.1
2,6-Dinitrotoluene.....	<0.1	<0.1	<0.1	<0.1	<0.1	<10	<3	<1
2-Chloronaphthalene.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.3	<0.1
2-Methylnaphthalene.....	<0.1	2	<0.1	<0.1	<0.1	<1	<0.3	<0.1
2-Methylphenol.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	0.7	<0.1
2-Nitrophenol.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.3	<0.1
2-Nitroaniline.....	<0.5	<0.5	<5	<0.1	<0.1	<1	<0.3	<0.1
2,4,5-Trichlorophenol.....	<0.5	<0.5	<5	<5	<5	<50	<15	<5
2-Chlorophenol.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<15	<5
2-Methyl-4,6-dinitrophenol.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.3	<0.1
3,3'-Dichlorobenzidine.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.3	<0.1
3-Nitroaniline.....	<0.5	<0.5	<5	<5	<5	<50	<16	<5
4-Bromophenylphenylether.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.3	<0.1
4-Chloro-3-methylphenol.....	<0.1	<0.1	<0.1	1.0	<0.1	<1	<0.3	<0.1
4-Chlorophenylphenylether.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.3	<0.1
4-Chloroaniline.....	<0.5	<0.5	<1	<1	<1	<10	<3	<1
4-Methylphenol.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.3	<0.1
4-Nitrophenol.....	<2	<2	<2	<2	<2	<20	<6	<2
4-Nitroaniline.....	<0.5	<0.5	<5	<5	<5	<50	<15	<5
Acenaphthene.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	4.3	<0.1
Acenaphthylene.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.3	<0.1
Aniline.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.3	<0.1
Anthracene.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<12	<0.1
Bis(2-ethylhexyl)phthalate.....	<10	<10	<10	<10	<10	<100	<30	<10
Benidine.....	<4	<4	<4	<4	<4	<40	<12	<4
Benzoic acid.....	<0.5	<0.5	<5	<5	<5	<50	<15	<5
Benzyl alcohol.....	<0.5	<0.5	<0.1	<0.1	<0.1	<1	<0.3	<0.1
Bis(2-chloroethyl) ether.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.3	<0.1
Bis(2-chloroisopropyl) ether.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.3	<0.1



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TABLE 4 (continued)
SEMIVOLATILE COMPOUND CONCENTRATIONS (METHOD 8270)
DETERMINED FOR SEDIMENT SAMPLES

COMPOUND (milligrams per kilogram)	SAMPLE ID/HANDHOLE NUMBER							
	S-7/D-14	S-8/D-14	S-19/D-23	S-20/D-23	S-27/D-A-471	S-28/A-471	S-33/D-33	S-34/D-33
Benzo(a)anthracene.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	13	<0.1
Benzo(a)pyrene.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	6	0.1
Benzo(b)fluoranthene.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	8.5	0.1
Benzo(g,h,i)perylene.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.3	<0.1
Benzo(k)fluoranthene.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	8.5	0.1
Butylbenzylphthalate.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.3	<0.1
Chrysene.....	<0.1	<0.1	0.1	<0.1	0.1	<1	16	0.3
Di-n-octylphthalate.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.3	<0.1
Dibenzo(a,h)anthracene.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	1.8	<0.1
Dibutylphthalate.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.3	<0.1
Diethylphthalate.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.3	<0.1
Dimethylphthalate.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.3	<0.1
Dibenzofuran.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	3.3	<0.1
Fluorene.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	5.5	<0.1
Fluoranthene.....	<0.1	<0.1	0.1	0.2	<0.1	<1	33	0.2
Hexachlorobenzene.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.3	<0.1
Hexachlorobutadiene.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.3	<0.1
Hexachlorocyclopentadiene.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.3	<0.1
Hexachloroethane.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.3	<0.1
Indeno(2,2,3-c,d)pyrene.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	4	<0.1
Isophorone.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.3	<0.1
n-Nitrosodi-n-propylamine.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.3	<0.1
n-Nitrosodimethylamine.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.3	<0.1
n-Nitrosodiphenylamine.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.3	<0.1
Naphthalene.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	1	<0.1
Nitrobenzene.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.3	<0.1
Pentachlorophenol.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.3	<0.1
Phenanthrene.....	<0.1	<0.1	<0.1	0.1	<0.1	<1	47	0.3
Phenol.....	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.3	<0.1
Pyrene.....	<0.1	<0.1	<0.1	<0.1	0.1	<1	27	0.2
Laboratory.....	B&C	B&C	B&C	B&C	B&C	B&C	B&C	B&C



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TABLE 5
METALS CONCENTRATIONS
DETERMINED FOR SEDIMENT SAMPLES

Sample ID/Hanhole Number COMPOUND	CONCENTRATION (mg/kg)							
	S-7/D-144	S-8/D-14	S-19/D-23	S-20/D-23	S-27/D-A-471	S-28/A-471	S-33/D-33	S-34/D-33
Aluminum.....	1,100	950	1,900	4,100	1,700	2,600	3,900	3,400
Antimony.....	<8	<8	<8	<8	8	9	<8	<8
Arsenic.....	0.6	<0.3	4.4	5.0	2.9	3.5	4.9	10
Barium.....	83	77	290	220	180	160	440	310
Beryllium.....	0.07	0.04	0.15	0.27	0.05	0.04	<0.03	0.10
Cadmium.....	2.8	<0.5	13	11	7.3	9.1	14	18
Calcium.....	5,800	3,100	12,200	15,000	35,000	35,000	42,200	46,000
Chromium.....	30	32	230	590	120	85	1,410	1,300
Cobalt.....	1	<1	4	6	2	3	19	17
Copper.....	21	8	800	670	770	830	780	610
Iron.....	5,180	3,800	13,000	15,000	11,000	12,000	18,200	7,100
Lead.....	<5	<5	180	240	17	29	32	29
Magnesium.....	770	650	870	910	1,100	1,100	1,400	1,100
Manganese.....	22	22	50	54	51	52	90	38
Mercury.....	<0.5	<0.5	1.4	7.1	0.9	0.6	<0.4	0.6
Nickel.....	6	7	140	310	67	48	270	210
Potassium.....	240	530	390	390	290	280	370	280
Selenium.....	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Silver.....	<0.5	<0.5	2.2	1.4	2.6	3.0	3.1	3.6
Sodium.....	110	79	220	230	270	270	350	400
Thallium.....	<5	<5	<5	<5	<5	<5	<5	<5
Vanadium.....	3.7	2.3	8.4	8.2	5	7	13	9
Zinc.....	33	30	670	960	120	260	81	70
Laboratory.....	B&C	B&C	B&C	B&C	B&C	B&C	B&C	B&C

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TABLE 6
CYANIDE, TOTAL ORGANIC CARBON, pH, OIL AND GREASE ANALYTICAL RESULTS
DETERMINED FOR SEDIMENT SAMPLES

Sample ID/Hanhole Number COMPOUND	CONCENTRATIONS							
	S-7/D-14	S-8/D-14	S-19/D-23	S-20/D-23	S-27/A-471	S-28/A-471	S-33/D-33	S-34/D-33
Cyanide (mg/kg).....	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	<0.5
Total Organic Carbon (mg/kg).....	10,000	2,500	15,000	14,000	12,000	12,000	16,000	30,000
pH.....	7.9	8.0	8.0	7.2	8.6	8.5	6.6	6.5
Oil and Grease (mg/kg).....	97	110	2,800	4,100	1,400	1,200	1,600	1,700
Laboratory.....	B&C	B&C	B&C	B&C	B&C	B&C	B&C	B&C



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TABLE 7
 ATTERBERG LIMITS AND PARTICLE SIZE
 DETERMINATION SUMMARY

<u>MANHOLE NUMBER</u>	<u>SAMPLE NUMBER</u>	<u>ATTERBERG LIMITS (percent)</u>	<u>PARTICLE SIZE (percent)</u>		
			<u>FINES</u>	<u>GRAVEL</u>	<u>SAND</u>
D-13	S-4	Nonplastic behavior	6	56	38
A-459	S-12	Nonplastic behavior	5	73	22
A-464	S-21	Nonplastic behavior	6	38	56
A-470	S-25	Nonplastic behavior	1	41	58
A-473	S-30	Nonplastic behavior	1	35	64
A-475	S-35	Nonplastic behavior	10	37	53

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TABLE 8
PESTICIDE CONCENTRATIONS DETERMINED FOR
LIQUID SEWAGE SAMPLES

CH2M HILL SAMPLE LOCATION	LACSD MANHOLE ID	BHC (ug/l)					DDT (ug/l)						
		ALPHA	BETA	DELTA	GAMMA	TOTAL	p,p-DDD	p,p-DDE	p,p-DDT	o,p-DDD	o,p-DDE	o,p-DDT	TOTAL
MH-1	D-9	<0.8	<0.8	<0.8	<0.8	<0.8	<2	<1	<1	<2	<1	<1	<2
MH-1	D-9	<0.8	<0.8	<0.8	<0.8	<0.8	<2	<1	<1	<2	<1	<1	<2
MH-1	D-9	<0.8	<0.8	<0.8	<0.8	<0.8	<2	<1	<1	<2	<1	<1	<2
MH-3	D-13	<0.8	<0.8	<0.8	<0.8	<0.8	<2	<1	<1	<2	<1	<1	<2
MH-4	A-444	<0.8	<0.8	<0.8	<0.8	<0.8	<2	<1	<1	<2	<1	<1	<2
MH-6	D-14	<0.8	<0.8	<0.8	<0.8	<0.8	<2	<1	<1	<2	<1	<1	<2
MH-7	A-455	<0.8	<0.8	<0.8	<0.8	<0.8	<2	<1	<1	<2	<1	<1	<2
MH-9	A-459	<0.8	<0.8	<0.8	<0.8	<0.8	<2	<1	<1	<2	<1	<1	<2
MH-9	A-459	<0.8	<0.8	<0.8	<0.8	<0.8	5.6	1.8	1.6	<2	<1	<1	8.7
MH-10	D-187	<0.8	<0.8	<0.8	<0.8	<0.8	6.2	<1	7.6	<2	<1	<1	14
MH-11	D-16	<0.8	<0.8	<0.8	<0.8	<0.8	<2	<1	<1	<2	<1	<1	<2
MH-11	D-16	<0.8	<0.8	<0.8	<0.8	<0.8	<2	<1	1	<2	<1	<1	<2
MH-13	D-21	<0.8	<0.8	<0.8	<0.8	<0.8	<2	<1	<1	<2	<1	<1	<2
MH-14	D-23	<0.8	<0.8	<0.8	<0.8	<0.8	<2	<1	<1	<2	<1	<1	<2
MH-16	D-25	<0.8	<0.8	<0.8	<0.8	<0.8	<2	<1	1.7	<2	<1	<1	1.7
MH-16	D-25	<0.8	<0.8	<0.8	<0.8	<0.8	10	5.8	14	<2	<1	<1	30
MH-17	A-470	<0.8	<0.8	<0.8	<0.8	<0.8	2.4	<1	2.7	<2	<1	<1	5.1
MH-17	A-470	<0.8	<0.8	<0.8	<0.8	<0.8	<2.0	<1.0	<1.0	<2.0	<1.0	<1.0	<2.0
MH-19	A-471	<0.8	<0.8	<0.8	<0.8	<0.8	1.4	<1.0	2.1	<2.0	<1.0	<1.0	3.5
MH-21	A-473	<0.8	<0.8	<0.8	<0.8	<0.8	5.0	<1	14	<2	<1	<1	19
MH-22	D-31	<0.8	<0.8	<0.8	<0.8	<0.8	12	<1	17	<2	<1	<1	29
MH-23	D-32	<0.8	<0.8	<0.8	<0.8	<0.8	1.7	3.5	4.4	<2.0	<1.0	<1.0	9.6
MH-24	A-475	<0.8	<0.8	<0.8	<0.8	<0.8	4.9	3.4	5.4	<2.0	<1.0	<1.0	14
MH-24	A-475	<40.	<40.	<40.	<40.	<40.	160	180	190	<100	<50	<50	530



HARGIS + ASSOCIATES, INC.

TABLE 8 (continued)
PESTICIDE CONCENTRATIONS DETERMINED FOR
LIQUID SEWAGE SAMPLES

LACSD MANHOLE ID	BHC (ug/l)					DDT (ug/l)						
	ALPHA	BETA	DELTA	GAMMA	TOTAL	p,p-DDD	p,p-DDE	p,p-DDT	o,p-DDD	o,p-DDE	o,p-DDT	TOTAL
<u>BACKGROUND SAMPLES</u>												
D-40	<0.8	<0.8	<0.8	<0.8	<0.8	<2.0	<1.0	<1.0	<2.0	<1.0	<1.0	<2.0
A-483	<0.8	<0.8	<0.8	<0.8	<0.8	<2.0	<1.0	<1.0	<2.0	<1.0	<1.0	<2.0
A-481	<0.8	<0.8	<0.8	<0.8	<0.8	<2.0	<1.0	1.5	<2.0	<1.0	<1.0	<2.0
D-41	<0.8	<0.8	<0.8	<0.8	<0.8	<2.0	<1.0	1.5	<2.0	<1.0	<1.0	1.5
D-42	<0.8	<0.8	<0.8	<0.8	<0.8	<1	<1.0	1.4	<2	<1	<1	1.4
A-480	<0.8	<0.8	<0.8	<0.8	<0.8	15	<1	22	<2	<1	<1	37
A-482	<0.8	<0.8	<0.8	<0.8	<0.8	<2	<1	<1	<2	<1	<1	<2
D-39	<0.8	<0.8	<0.8	<0.8	<0.8	6.6	<1	15	<2	<1	<1	22



HARGIS + ASSOCIATES, INC.

TABLE 9
PESTICIDE CONCENTRATIONS DETERMINED FOR
LIQUID COMPOSITE SAMPLES

DATE SAMPLE COLLECTED	BHC (ug/l)					DDT (ug/l)						
	ALPHA	BETA	DELTA	GAMMA	TOTAL	p,p-DDD	p,p-DDE	p,p-DDT	o,p-DDD	o,p-DDE	o,p-DDT	TOTAL
8-23-88	<0.8	<0.8	<0.8	<0.8	<0.8	2.7	1.4	1.7	<2.0	<1.0	<1.0	5.8
8-29-88	<0.8	<0.8	<0.8	<0.8	<0.8	<2	<1	<1	<2	<1	<1	<2
8-30-88	<0.8	<0.8	<0.8	<0.8	<0.8	<2	<1	<1	<2	<1	<1	<2
8-31-88	<0.8	<0.8	<0.8	<0.8	<0.8	10	4.1	1.8	<2.0	<1.0	<1.0	16
9-1-88	<0.8	<0.8	<0.8	<0.8	<0.8	<2	<1	<1	<2	<1	<1	<2
9-6-88	<0.8	<0.8	<0.8	<0.8	<0.8	<2	<1	<1	<2	<1	<1	<2
9-7-88	<0.8	<0.8	<0.8	<0.8	<0.8	<2	<1	1.8	<2	<1	<1	1.8
9-7-88	<0.8	<0.8	<0.8	<0.8	<0.8	9.3	1.7	13	<2	<1	<1	24
9-8-88	<0.8	<0.8	<0.8	<0.8	<0.8	7.0	3.7	9.6	<2	<1	<1	21
9-9-88	<0.8	<0.8	<0.8	<0.8	<0.8	3.3	2.4	4.3	<2	<1	<1	10

TABLE 10

ESTIMATES OF SEDIMENT VOLUME AND DDT CONTENT IN THE SEDIMENT
IN THE DISTRICT 5 INTERCEPTOR SEWER LINE


SEWER SEGMENT	MANHOLE ID		SEGMENT LENGTH (ft)	ESTIMATED SEDIMENT DEPTHS (in)		ESTIMATED SEDIMENT VOLUME (ft ³)	TOTAL DDT CONCENTRATION (mg/kg)			ESTIMATED WEIGHT OF DDT (lbs)
	BEGIN	END		BEGIN	END		BEGIN	END	AVERAGE	
1	A-442	A-443	800	0.0	0.0	0	0	0	0	0.0
2	A-443	A-444	870	0.0	4.7	349	0	340	170	5.9
3	A-444	A-447	720	4.7	0.0	289	340	0	170	4.9
4	A-447	A-448	820	0.0	0.0	0	0	0	0	0.0
5	A-448	A-450	1,500	0.0	0.0	0	0	0	0	0.0
6	A-450	A-453	1,050	0.0	0.0	0	0	0	0	0.0
7	A-453	A-454	570	0.0	0.0	0	0	0	0	0.0
8	A-454	A-455	125	0.0	0.3	1	0	53	26	<0.1
9	A-455	A-457	1,425	0.3	0.0	9	53	0	26	<0.1
10	A-457	A-458	1,000	0.0	0.0	0	0	0	0	0.0
11	A-458	A-459	130	0.0	0.7	3	0	37	18	<0.1
12	A-459	A-460	300	0.7	0.0	7	37	0	18	<0.1
13	A-460	A-464	980	0.0	0.1	1	0	2,400	1,200	0.1
14	A-464	A-466	660	0.1	0.0	1	2,400	0	1,200	0.1
15	A-466	A-467	700	0.0	0.0	0	0	0	0	0.0
16	A-467	A-469	1,210	0.0	0.0	0	0	0	0	0.0
17	A-469	A-470	50	0.0	1.0	2	0	1.4	0.7	<0.1
18	A-470	A-471	750	1.0	4.7	302	1.4	36	19	0.6
19	A-471	A-473	1,360	4.7	3.0	754	36	28	32	2.4
20	A-473	A-474	380	3.0	0.3	74	28	18.5	23	0.2
21	A-474	A-475	620	0.3	0.7	17	18.5	8.5	13	<0.1
22	A-475	A-480	2,740	0.7	0.0	59	8.5	0	4	<0.1
23	A-480	A-482	1,200	0.0	0.0	0	0	0	0	0.0
24	A-482	A-483	360	0.0	0.0	0	0	0	0	0.0
TOTALS						1,868				14.2



HARGIS + ASSOCIATES, INC.

TABLE 11
ESTIMATES OF SEDIMENT VOLUME AND DDT CONTENT IN THE SEDIMENT
IN THE JO "D" SEWER LINE

SEWER SEGMENT	MANHOLE ID		SEGMENT LENGTH (ft)	ESTIMATED SEDIMENT DEPTHS (in)		ESTIMATED SEDIMENT VOLUME (ft ³)	TOTAL DDT CONCENTRATION (mg/kg)			ESTIMATED WEIGHT OF DDT (lbs)
	BEGIN	END		BEGIN	END		BEGIN	END	AVERAGE	
1	D-5	D-7	510	0.0	0.0	0	0	0	0	0.0
2	D-7	D-9	1,910	0.0	0.0	0	0	0	0	0.0
3	D-9	D-11	2,130	0.0	0.0	0	0	0	0	0.0
4	D-11	D-12	655	0.0	2.0	75	0	3,150	1,575	11.8
5	D-12	D-13	840	2.0	4.3	398	3,150	2,500	2,825	112.4
6	D-13	D-14	480	4.3	0.5	179	2,500	150	1,325	23.7
7	D-14	D-15	20	0.5	0.0	1	150	0	75	<0.1
8	D-15	D-15A	610	0.0	0.0	0	0	0	0	0.0
9	D-15A	D-16	635	0.0	0.0	0	0	0	0	0.0
10	D-16	D-19	1,080	0.0	0.0	0	0	0	0	0.0
11	D-19	D-21	2,510	0.0	0.0	0	0	0	0	0.0
12	D-21	D-22	310	0.0	0.0	0	0	0	0	0.0
13	D-22	D-23	880	0.0	0.0	0	0	0	0	0.0
14	D-23	D-24	650	0.0	0.0	0	0	0	0	0.0
15	D-24	D-25	660	0.0	0.0	0	0	0	0	0.0
16	D-25	D-27	730	0.0	1.3	38	0	9,500	4,750	18.1
17	D-27	D-29	880	1.3	6.7	559	9,500	210,000	109,750	6,023.0
18	D-29	D-31	1,290	6.7	0.7	780	210,000	360	105,180	8,204.0
19	D-31	D-32	700	0.7	0.0	14	360	0	180	0.3
20	D-32	D-33	690	0.0	0.3	4	0	1.6	0.8	<0.1
21	D-33	D-34	380	0.3	0.3	4	1.6	1.6	1.6	<0.1
22	D-187	D-189	800	0.0	0.0	0	0	0	0	0.0
23	D-189	D-190	250	0.0	0.0	0	0	0	0	0.0
24	D-190	D-21	420	0.0	0.0	0	0	0	0	0.0
TOTALS						2,052				14,375.2

 HARGIS + ASSOCIATES, INC.

TRANSMITTAL SHEET FOR REGION 4 FILE ROOM

Check appropriate file type:

☐ Permitting ☐ Surveillance

☒ Mitigation ☐ Abandoned

☐ Mailer ☐ Other

Check appropriate location:

☐ A ☐ B ☒ C

☐ D ☐ E ☐ F

☐ CREATE NEW FILE

☒ FILE ALREADY EXISTS

FACILITY NAME: MONTROSE CHEMICAL

SITE ADDRESS: 26201 Normandie Ave

CITY: TORRANCE AREA COUNTY: LA

EPA NO: _____ ZIP: 90502

Please check if ☒ Regular File ☐ Confidential File

YOUR NAME: ALICE GIMENO

UNIT: SMU